NASA SP-7011 (423)
September 30, 1996

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Introduction

This issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA SP-7011) lists 57 reports, articles, and other documents recently announced in the NASA STI Database.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

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Typical Report Citation and Abstract

ACCESSION NUMBER ↓

DOCUMENT ID NUMBER → **19960021053;** 96N24540 NASA Langley Research Center, Hampton, VA USA. ← **CORPORATE SOURCE**

TITLE → **An Extended Compact Tension Specimen for Fatigue Crack Propagation and Fracture**

AUTHORS → Piascik, R. S., NASA Langley Research Center, USA; Newman, J. C., Jr., NASA Langley Research Center, USA; ← **AUTHORS' AFFILIATION**

PUBLICATION DATE → Mar. 1996, pp. 16; In English

CONTRACTS/GRANTS → Contract(s)/Grant(s): RTOP 538–02–10–01

REPORT NO.(S) → Report No.(s): NASA–TM–110243; NAS 1.15:110243; No Copyright; Avail: CASI A03, Hardcopy; A01, Microfiche ← **AVAILABILITY AND PRICE CODE**

ABSTRACT → An extended compact tension specimen, EC(T) has been developed for fatigue and fracture testing. Documented herein are stress-intensity factor and compliance expressions for the EC(T) specimen.

ABSTRACT AUTHOR → Author

SUBJECT TERMS → *Crack Propagation; Stress Intensity Factors; Fatigue (Materials)*

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 423)

SEPTEMBER 30, 1996

51
LIFE SCIENCES (GENERAL)

19960034222; 96N30105 Veterans Administration Hospital, Philadelphia, PA USA

X-ray crystallography of botulinum neurotoxins ***Annual Report, 1 May 1993 - 30 Sep. 1995***

Sax, Martin, Principal Investigator, Veterans Administration Hospital, USA; Oct. 1995; 8p; In English

Contract(s)/Grant(s): MIPR-93MM3557

Report No.(s): AD-A303514; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Botulinum neurotoxin, type E (Bot E) was purified to evaluate the affects of purity on cry stallization. It was found that purification of the product from PHLS/CAMR Proton, Salisbury, VK did not improve crystal quality significantly. Accordingly, the product was used as supplied in further crystallization experiments. Diffraction quality crystals were grown by VAMC personnel at Fort Detrick, but the crystal which were transported in sealed capillary tubes deteriorated in transportation. To overcome this problem, a safe and secure laboratory was set up in the Pittsburgh VAMC (UD) in compliance with Federal regulations to handle Bot E neurotoxin. Crystals were grown which diffracted to 3.A, and a set of intensity data was collected from it. Work is progressing with the aim of getting more mature and derivative data.

DTIC

Crystallography; X Ray Diffraction; Crystallization; Clostridium Botulinum

19960034236; 96N30118 Massachusetts Univ., Amherst, MA USA

Engineering of Proteins and Devices for Biosensor Applications ***Final Report***

Tirrell, David A., Massachusetts Univ., USA; Sep. 30, 1995; 19p; In English

Contract(s)/Grant(s): DAAK60-93-K-0007

Report No.(s): AD-A303806; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The technical objective of this project is the development of new sensors for the detection of organophosphate pesticides and chemical warfare agents. A critical step in the fabrication of such sensors is the coupling of an appropriate enzyme to a sensing element, e.g., an electrode or an optical fiber. We have proposed the re-engmeering of the phosphotriesterase from Pseudomonas diminuta or Flavobacterium, such that it with assemble spontaneously on glass sensing elements without loss of activity. This enzyme has previously been isolated, cloned, and expressed in E. coli, and has been shown to hydrolyze the commonly used organophosphorus insecticides dursban, parathion, diazinon and cyanophos as well as the nerve agents sarin and soman. The enzyme has also been shown to retain activity when adsorbed on trityl agarose.

DTIC

Bioinstrumentation; Chemical Warfare; Proteins; Detection; Phosphates; Enzymes; Organic Phosphorus Compounds

19960034237; 96N30119 Duke Univ., School of the Environment., Beaufort, NC USA

Advanced Research Training in Marine Molecular Biology and Biotechnology ***Final Report, 1 May 1992 - 30 Apr. 1994***

VanBeneden, Rebecca J., Duke Univ., USA; Jan. 18, 1996; 9p; In English

Contract(s)/Grant(s): N00014-92-J-1958

Report No.(s): AD-A303808; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The ONR sponsored grant entitled 'Advanced Research Training in Marine Molecular Biology and Biotechnology' founded a training course to teach students and established scientists the basic principles of modern recombinant DNA technology. The emphasis was on the development of marine models and problems in environmental and ocean sciences. Students were trained in the isolation and characterization of DNA and RNA which included Southern and Northern blotting, DNA sequencing and DNA libraries. Other techniques taught were the use of the polymerase chain reaction (PCR), in situ hybridization, gene transfer, mtDNA analysis and immunoblotting. These techniques were applied to problems in environmental toxicology, marine microbiology, the development of transgenic organisms, evolution and population studies, developmental biology and gene expression analysis.

DTIC

Molecular Biology; Microbiology; Marine Biology; Biotechnology; Deoxyribonucleic Acid; Education; Organisms; Ribonucleic Acids

19960034342; 96N30205 NASA Ames Research Center, Moffett Field, CA USA

Low Spillage Metabolic Feeder

Evans, JuliAnn, Inventor, NASA Ames Research Center, USA; Gundo, Daniel P., Inventor, NASA Ames Research Center, USA; Harper, Jennifer S., Inventor, NASA Ames Research Center, USA; Mulenburg, Gerald M., Inventor, NASA Ames Research Center, USA; Skundberg, Thomas L., Inventor, NASA Ames Research Center, USA; Mar. 19, 1996; 7p; In English

Patent Info.: NASA-Case-ARC-12063-1; US-Patent- 5,499,609; US-Patent-Appl-SN-217909; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An animal feeder for use in a metabolic cage is introduced. The feeder includes a confined passageway and an adjustable notched gate proceeding a food cup. The gate is adjusted so that the entry area to the food cup approximates the cross sectional head area of the animal. Food ejected from the food cup by a caged animal is dropped through a grate into a spill tray.

Official Gazzette of the U.S. Patent and Trademark

Trays; Spilling; Food; Provisioning

19960034348; 96N30210 Texas Univ., Dept. of Otolaryngology., Galveston, TX USA

Studies of Vestibular Neurons in Normal, Hyper- and Hypogravity ***Final Report***

Correia, Manning J., Texas Univ., USA; Jun. 12, 1996; 64p; In English

Contract(s)/Grant(s): NAG2-446

Report No.(s): NASA-CR-201425; NAS 1.26:201425; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

During the past year, pre-, in- and postflight studies were conducted in association with the Axon project for Bion 10 (Cosmos 2229). Recordings were made during pre- and postflight studies, from 118 horizontal semicircular canal afferents and 27 vestibular nucleus neurons in 7 rhesus monkeys; 137 pulse rotation protocols alone were executed (548 acceleration and deceleration responses were curve fit). Usable data was obtained from 127 horizontal afferents concerning their spontaneous discharge. Curve fits and analysis was made of sinusoidal and sum of sinusoidal responses from 42 and 35 horizontal afferents, respectively. Also recordings were made from neurons inflight from the two flight animals. The mean spontaneous rate varied from 128 spikes/sec. during preflight to 92 spikes/sec during postflight (day 5) - a change of 28%. In direct contrast to the results of Cosmos 2044, the best fitted neural adaptation operator (k) and the gain of the pulse response were decreased during post flight when compared to preflight. Surprisingly, the best fitted gain and k values for the sum of sines were slightly elevated during post flight tests. The gain and phase of single sine responses were compared for pre- and post flight tests and compared to a larger population of afferents. In contrast to Cosmos 2044 results where on the first day of post flight testing the gains of the best fitted sine response were skewed toward the higher values of the Miles and Braitman distribution, the gain of the best fitted sine responses during the first day of post flight testing (day 2) during Cosmos 2229 were exactly on the mode of the Miles and Braitman distribution. Thus, at least for the periodic stimuli, (pulses and sine waves) we found no change in gain and neural adaptation during post flight testing following Cosmos 2229. This conclusion is different from the one derived following the Cosmos 2044 flight. Cosmos flight 2229 differed from Cosmos flight 2044 in several significant ways: For example, during preflight, (1) The animals preflight training was different (less well trained on the gaze task) and (2) the animals were exposed to more experimental manipulations (surgical and rotational). Inflight, (1) the animals were required to make a pointing gesture (motor response) in association with eye movements to obtain reward, (2) the inflight diet was different (more balanced), (3) the feeder for one of the animals clogged following 9 days of flight resulting in evident dehydration and probably less head motion exposure in that monkey and (4) there was limited video taping of the monkeys in space. During postflight, (1) we were unable to test the flight animals until 26 hours postflight as compared to 14.5 hours during Cosmos 2044, (2) the animals received significantly more exposure to motion stimuli during postflight testing than during Cosmos 2044. These differences in the vestibular environment will require analysis of several parameters other than just neural and eye movement responses. For example, computer programs will have to be written and used to recover and quantify the number of head movements made by each animal during flight. This activity is critical to the production of neural adaptation and increased gain.

Author

Vestibules; Neurons; Rotation; Head Movement; Physiological Responses; Gravitational Effects; Spaceborne Experiments

19960035557; 96N30323 North Carolina State Univ., Raleigh, NC USA

Functional Characterization of Odorant Receptors ***Final Report, 15 Mar. - 14 Dec. 1995***

Anholt, Robert R. H., North Carolina State Univ., USA; Jan. 26, 1996; 29p; In English

Contract(s)/Grant(s): DAAH04-94-G-0027

Report No.(s): AD-A303848; ARO-32678.2-LS; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of this research program was to enhance our understanding of the molecular mechanisms that underlie odor recognition. Odorant receptors are G-protein-linked receptors that couple binding of odorants to activation of adenylyl cyclase or phospholipase C. They show extensive sequence diversity in their transmembrane domains, especially the fourth and fifth transmembrane helices, referred to

as the 'hypervariable odorant binding domain.' A chimeric receptor was constructed in which a cassette encoding the hypervariable odorant binding domain of rat odorant receptor I-15 was inserted in the human P2-adrenergic receptor. This construct was cloned in a eukaryotic expression vector and expressed in stably transfected cells. This system forms the basis for future structure/function studies on the interactions between odorants and this hypervariable odorant binding domain. We initiated two additional lines of research that can provide insights in odor recognition and its relation to odor-guided behavior. One approach utilizes avoidance behavior toward certain odorants displayed by Drosophila melanogaster. This organism is amenable to genetic, molecular biological, neuroanatomical and behavioral studies, allowing multidisciplinary studies. The other approach centers on recognition of pheromones that trigger reproductive behavior via the vomeronasal organ and characterization of the signal transduction pathways they activate.
DTIC
Odors; Sympathetic Nervous System; Proteins; Eukaryotes; Olfactory Perception; Chemoreceptors

19960035562; 96N30327 Naval Medical Research Inst., Bethesda, MD USA
Multiple Gene Blotting to Screen for Cytokine RNA Expression: Application to Endothelioma Cells
Chang, Henry, Naval Medical Research Inst., USA; Li, Ying-Yue, Naval Medical Research Inst., USA; Siebert, Paul D., Naval Medical Research Inst., USA; Rollwagen, Florence M., Naval Medical Research Inst., USA; Nielsen, Thor B., Naval Medical Research Inst., USA; Dec. 1995; 13p; In English
Contract(s)/Grant(s): Navy Proj. MR04120; Navy Proj. MM33C30
Report No.(s): AD-A304203; NMRI-95-83; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

BACKGROUND: Because normal and tumor cells can secrete different cytokines, it has been a matter of educated guesswork to select which factors to study. Nevertheless, many can be missed, so we have developed a method to screen for unanticipated cytokine expression. EXPERIMENTAL DESIGN: Amplification products from polymerase chain reactions (PCR) of different cytokine genes were spotted onto nylon membranes, and probed with radioactive cDNAs made from mouse endothelioma cells. RESULTS: The presence of interleukin-3 was detected, and confirmed by conventional Northern blotting and polymerase chain reaction (PCR). CONCLUSIONS: This method may be useful to survey cells for the expression of cytokine genes.
DTIC
Cells (Biology); Experiment Design; Immune Systems; Polymerization; Deoxyribonucleic Acid; Genes; Membranes; Cancer

19960035647; 96N30404 University of Western Ontario, London, Ontario Canada
Millimeter wave ocular research ***Final Report, 1 Jan. 1986 - 30 Dec. 1988***
Trevithick, John R., University of Western Ontario, Canada; Sep. 30, 1995; 52p; In English
Contract(s)/Grant(s): DAMD17-86-C-6084
Report No.(s): AD-A302963; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Techniques were developed for irradiation of rabbit eyes with 35 GHz millimeter waves to determine cellular damage mechanism and thresholds. The irradiation was performed using anaesthetized 2.5 kg New Zealand white rabbits exposed to 35 GHz pulsed and continuous wave (OW) irradiation delivered by a special focusing antenna to a spot approximately 1.3 cm diameter in which the rabbit eye was placed. The peak specific absorption rate (SAR) (1.4 mW/g per 1 mW/sq cm of incident power) was determined with the aid of a thermographic camera which gave a map of the local corneal surface temperatures; the SAR assumed the values of thermal conductivity and specific heat for water since the cornea contains so much water. The damage observed has been divided into four categories which are progressively increased, by SEM and LM evaluations. The unirradiated left cornea appears to serve as an appropriate control. This damage appears to increase (1) as the irradiation is modulated by pulsing at the same power; and (2) as the same total energy is delivered
DTIC
Irradiation; Eye (Anatomy); Millimeter Waves; Rabbits; Thermal Conductivity; Specific Heat; Continuous Radiation

19960035702; 96N30457 Tulsa Univ., OK USA
Chromophore Attachment in the Cyanobacterial Light-Harvesting Proteins ***Final Report, Jun. 1992 - Nov. 1995***
Anderson, Lamont, Tulsa Univ., USA; Nov. 1995; 10p; In English
Contract(s)/Grant(s): DAAL03- 92-G-0248
Report No.(s): AD-A303851; ARO-29537.4-LS; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Light harvesting in the cyanobacteria is conducted by a complex, self-assembling structure called the phycobilisome, which contains a number of proteins that have covalently linked bilin chromophores (the biliproteins). We have utilized a protein engineering approach to study the structural determinants of chromophore attachment to the biliproteins. As the project developed, we discovered that disruption of the biliprotein subunit structure resulted in severe degradation in vivo. We have established that the earliest interactions in the phycobilisome assembly pathway are crucial to the stability of these proteins and must occur accurately and rapidly to avoid degradation. We have examined the role of chromophore attachment in protein stability and the data indicate that

covalent attachment of the central bilins in both a and s subunits is needed to stabalize these proteins for assembly. We have used domain exchange experiments to examine chromophore attachment and have found three residues that appear to be required for protein stability and chromophore attachment. We have developed a system for investigating the molecular basis of recognition and docking between biliprotein a and s subunits and have preliminary results from this work.
DTIC
Chromophores; Bacteria; Proteins; Stability

19960035937; 96A65776
Electrical effect of neurotoxin on Na(+) channel in biological membrane
Norian, K. H., Lehigh Univ, USA; Journal of Materials Science Letters; January 1996; ISSN 0261-8028; vol. 15, no. 1, pp. 57-59; In English; Copyright; Avail: Issuing Activity

Neurotoxins are electrically charged molecules that act on ion channels to alter the electrical characteristics of electrically excitable membranes. This paper considers a particular neurotoxin: tetrodotoxin (TTX). TTX is a potent poison of the puffer fish. In membranes containing Na(+) and K(+) channels, TTX selectively blocks Na(+) channels. This prevents the propagation to electrical impulses along nerve fibers and results in paralysis. It acts on muscle membrane in the same way. This action of the TTX is explained using the charge control model of ion channels.
Author (EI)
Bioelectric Potential; Electric Charge; Electric Pulses; Membranes; Potassium; Sodium; Tissues (Biology)

19960036045; 96A65884
Decay correction methods in dynamic PET studies
Chen, Kewei, Good Samaritan Regional Medical Cent, USA; Reiman, Eric; Lawson, Michael; Feng, Dagan; Huang, Sung-Cheng; IEEE Transactions on Nuclear Science; December 1995; ISSN 0018-9499; vol. 42, no. 6, pt. 2, pp. 2173-2179; In English; Copyright; Avail: Issuing Activity

In order to reconstruct positron emission tomography (PET) images in quantitative dynamic studies, the data must be corrected for radioactive decay. One of the two commonly used methods ignores physiological processes including blood flow that occur at the same time as radioactive decay; the other makes incorrect use of time-accumulated PET counts. In simulated dynamic PET studies using (sup 11)C-acetate and (sup 18)F-fluorodeoxyglucose (FDG), these methods are shown to result in biased estimates of the time-activity curve (TAC) and model parameters. New methods described in this article provide significantly improved parameter estimates in dynamic PET studies.
Author (EI)
Blood; Error Analysis; Isotopic Labeling; Physiology; Positrons; Radioactive Decay; Radioactivity; Tomography

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19960034223; 96N30106 Armstrong Lab., Epidemiological Research Div., Brooks AFB, TX USA
An Epidemiologic Investigation of Health Effects in Air Force Personnel Following Exposure to Herbicides. Volume 2 ***Topical Report, May 1992 - May 1995***
Wolfe, William H., Armstrong Lab., USA; Lustik, Michael B., Science Applications International Corp., USA; Michalek, Joel E., Armstrong Lab., USA; Williams, David E., Scripps Clinic and Research Foundation, USA; Grubbe, William D., Science Applications International Corp., USA; Brockman, Amy S., Science Applications International Corp., USA; Milner, Judson C., Armstrong Lab., USA; Henriksen Gary L., Armstrong Lab., USA; Swaby, James A., Armstrong Lab., USA; Burnet, Frank R., Science Applications International Corp., USA; May 02, 1995; 441p; In English
Contract(s)/Grant(s): F41624-91-C-1006
Report No.(s): AD-A304308; AL-TR-920107-VOL-2; No Copyright; Avail: CASI; A19, Hardcopy; A04, Microfiche

Despite conclusive evidence that chlorophenols are potent carcinogens in laboratory animals, the carcinogenicity of dioxin in humans remains controversial. Traditional difficulties in extrapolating animal data to humans have limited the applicability and relevance of much of the experimental work. Numerous long-term exposure studies have established the carcinogenicity of 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD, or dioxin) in rats (1,2), mice (3-5), and hamsters (6). The consensus of most research is that TCDD is only weakly mutagenic and does not covalently bind to DNA or cause it to initiate repair synthesis, but that it does behave as a strong tumor promoter at the cellular level (7). The oncogemc response to TCDD in animals has been shown repeatedly to depend upon the age, sex, and strain of species as well as the dose and route of administration (8-10). In varying doses and routes of administration, TCDD has produced malignant neoplasms at multiple sites in rats (lung, oropharyngeal, thyroid, adrenal, and liver) (2,3), in mice (thyroid, thymus, connective tissue, and liver) (3), and in hamsters (cutaneous) (6). As summarized in detail in a recent review article (11), much of the basic research into the carcinogenicity of TCDD in laboratory animals has focused on the aryl hydrocarbon (Ah) receptor and the induction of the cytochrome PASO enyyme system (12-16). Though the Ah receptor has been isolated from the tissue of several human organs (e.g., liver, colon, tonsils) (17-22), the relevance of these observations to dioxin toxicity remains to be proven (23).
DTIC
Clinical Medicine; Deoxyribonucleic Acid; Flying Personnel

19960034235; 96N30117 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Determining Types of Health Effects to Persian Gulf Veterans Due to Exposure to Occupational Hazards

Nelson, Rebecca A., Air Force Inst. of Tech., USA; Dec. 1995; 128p; In English

Contract(s)/Grant(s): AF Proj. 6302

Report No.(s): AD-A303803; AFIT/GEE/ENV/95D-13; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Persian Gulf Veterans' Illnesses (PGVI) consists of multiple illnesses with overlapping symptoms and causes. This research examined health effects literature concerning several occupational chemicals, to identify significant adverse health trends and assess research quality, completeness, and relevance. After compiling this knowledge base, the research focus was narrowed to Chronic Fatigue Syndrome (CFS), solvents, and pyridostigmine bromide (PB). The existing data was analyzed and compared to PGVI health data using the nonparametric statistical method of contingency table analysis to prove or disprove a link between the substance and PGVI. The results of the contingency table analysis were used to make inferences concerning the relationship between the substances and PGVI. Results indicate there are many current data gaps concerning health effects from exposure to occupational chemicals. There was a statistically significant relationship between the symptom frequencies of CFS and PGVI, but not for solvents or for PB. These results suggest that CFS should be further examined as a possible related diagnosis for PGVI. Further research in this area should probably not be spent looking into solvents, as there was no association with the symptom frequencies of PGVI. PB should be examined at a synergistic agent in combination with other chemicals.

DTIC

Health; Biological Effects; Signs and Symptoms; Occupational Diseases; Physiological Effects; Exposure

19960034413; 96N30250 NASA Marshall Space Flight Center, Huntsville, AL USA

Crystals of Human Serum Albumin for Use in Genetic Engineering and Rational Drug Design

Carter, Daniel C., Inventor, NASA Marshall Space Flight Center, USA; Dec. 06, 1994; 18p; In English

Patent Info.: NASA-Case-MFS-28839-1; US-Patent-Appl-SN-351861

Report No.(s): NAS 1.71:MFS-28839-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This invention pertains to crystals of serum albumin and processes for growing them. The purpose of the invention is to provide crystals of serum albumin which can be studied to determine binding sites for drugs. Form 2 crystals grow in the monoclinic space P2(sub 1), and possesses the following unit cell constraints: a = 58.9 +/- 7, b = 88.3 +/- 7, c = 60.7 +/- 7, Beta = 101.0 +/- 2 degrees. One advantage of the invention is that it will allow rational drug design

NASA

Albumins; Genetic Engineering; Serums; Drugs; Crystal Structure

19960034420; 96N30256 NASA Langley Research Center, Hampton, VA USA

Digital Mammography with a Mosaic of CCD-Arrays

Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; McAdoo, James A., Inventor, NASA Langley Research Center, USA; Jan. 26, 1996; 23p; In English

Patent Info.: NASA-Case-LAR-15059-1; US-Patent-Appl-SN-601143

Report No.(s): NAS 1.71:LAR-15059-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present invention relates generally to a mammography device and method and more particularly to a novel digital mammography device and method to detect microcalcifications of precancerous tissue. A digital mammography device uses a mosaic of electronic digital imaging arrays to scan an x-ray image. The mosaic of arrays is repositioned several times to expose different portions of the image, until the entire image is scanned. The data generated by the arrays during each exposure is stored in a computer. After the final exposure, the computer combines data of the several partial images to produce a composite of the original x-ray image. An aperture plate is used to reduce scatter and the overall exposure of the patient to x-rays. The novelty of this invention is that it provides a digital mammography device with large field coverage, high spatial resolution, scatter rejection, excellent contrast characteristics and lesion detectability under clinical conditions. This device also shields the patient from excessive radiation, can detect extremely small calcifications and allows manipulation and storage of the image.

NASA

Charge Coupled Devices; Imaging Techniques; Digital Data; Mosaics; X Ray Imagery; Cancer; Medical Equipment

19960034425; 96N30261 Army Medical Center, Dept. of Clinical Investigation., Fort Gordon, GA USA

Clinical Investigation Program Report RCS MED-3OO (R1) ***Annual Report, 1 Oct. 1994 - 31 Sep. 1995***

Plowman, Kent M., Army Medical Center, USA; Jan. 12, 1996; 262p; In English; Limited Reproducibility: More than 20% of this document may be affected by poor print and microfiche quality

Report No.(s): AD-A304839; RSC/MED-300(R1); No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Subject report identifies the research activities conducted by Dwight David Eisenhower Army Medical Center investigators through protocols approved by the Institutional Review Committee for registration with the Department of

Clinical Investigation during Fiscal Year 1995, and other known publications and presentations by the Dwight David Eisenhower Army Medical Center professional staff. A Detail sheet of each protocol giving the objective, technical approach, and program is presented.
DTIC
Clinical Medicine; Medical Science

19960034777; 96A65069
The use of the coherent averaging method for selection of postpotentials and potentials of His's bundle on electrocardiograms
Konyukhov, A. G.; Terzi, V. F.; Radiotekhnika; September 1995; ISSN 0033-8486, no. 9mbe, pp. 69-70; In Russian; Copyright; Avail: Issuing Activity

The possibility of using the coherent averaging method in selection of weak signals from postpotentials and potentials of His's bundle at the noise level is shown on the basis of computer simulation of different electrocardiographic signals and noise. The signal to noise ratio and the displacement of signals averaged are varied respectively from 0 to 1 and from 0 to 0.1 s. The coherent averaging method can be used for reconstruction of signal shape in the central part in the presence of small signal trembling in respect to the reference point for noises described by autoregression processes up to the second order.
Author (EI)
Bioengineering; Computerized Simulation; Electrocardiography; Random Processes

19960034778; 96A65070
Cluster analysis of cortex visual evoked activity in magnetic measurements
Zhuravlev, Yu. E.; Bondarenko, N. A.; Nikulin, S. L.; Krupnova, N. G.; Kharding, G. F. A.; Singkh, K. D.; Barns, G. R.; Kholidej, J. I.; Radiotekhnika; September 1995; ISSN 0033-8486, no. 9mbe, pp. 71-75; In Russian; Copyright; Avail: Issuing Activity

A 19-channel neuromagnetometer was used to study the rapid time dynamics of visual evoked electric activity of human Cortex, Visually evoked magnetic responses were received by presenting color isoluminant stimulus. Sequences of the magnetic field maps with 1 ms interval were reconstructed in planar pseudocurrent density maps using Tikhonov's regularization. Further analysis of the data was based on the temporal correlation study of a signal at each position of the current source plane. The sequences of the current maps were transformed in a pattern of a few areas of clusters. Characteristic time window for cluster analysis was chosen equal to 100 ms. As a result, a few distinctive clusters could be obtained in the interval 50-150 ms after stimulus.
Author (EI)
Bioengineering; Brain; Cluster Analysis; Magnetic Fields; Magnetic Measurement; Magnetometers

19960034779; 96A65071
Dynamic IR thermography: possibilities of investigations of mechanisms of temperature reactions
Gulyaev, Yu. V.; Markov, A. G.; Koreneva, L. G.; Tarasov, A. V.; Radiotekhnika; September 1995; ISSN 0033-8486, no. 9mbe, pp. 78-81; In Russian; Copyright; Avail: Issuing Activity

The essential features of a dynamic IR thermography system and means to draw information from features of transitional temperature processes are described. For the use of the method, the knowledge of the mechanism of temperature reactions is shown to be important. The study of reactions is shown to include mathematical or experimental models and the use of modern hardware and software with appropriate temporal and spatial resolution. The results are presented that confirm formation of skin temperature dynamics mainly by regulation of the peripheral blood flow with the depth up to several millimeters. Examples of dividing temporal dynamics by double prime physical double prime and double prime regulated double prime parts are given. The main factors taking part in regulation of several transitional processes are discussed.
Author (EI)
Bioengineering; Blood Flow; Imaging Techniques; Infrared Imagery; Thermography

19960034780; 96A65072
The process governing UV-induced chemiluminescence of human skin in vivo
Kononov, R. I.; Koreneva, L. G.; Lebedev, A. V.; Markov, A. G.; Radiotekhnika; September 1995; ISSN 0033-8486, no. 9mbe, pp. 82-84; In Russian; Copyright; Avail: Issuing Activity

Mechanisms of UV-induced chemiluminescence (ICL) of intact human skin and useful data, which can be obtained using the ICL, are discussed. Analysis of ICL decay is described. The study of different exponential parts of the ICL decay curve is shown to give information about various parameters of peroxide oxidation of lipids. The exponential part with time constant about 5 s gives information about the quantity of antioxidants, the part with time constant approximately = 1-2 min depends mostly on the active oxygen forms and the part with time constant approximately = 10 min depends on antioxidant reparation systems.
Author (EI)
Chemiluminescence; Luminaires; Photochemical Reactions; Skin (Anatomy); Ultraviolet Radiation

19960034781; 96A65073
Possibilities of dynamic thermomapping in the microwave and infrared bands in an oncology hospital
Sel'skij, A. G.; Fisher, A. M.; Dubynina, V. P.; Gulyaev, Yu. V.; Bogdasarov, Yu. B.; Zajtseva, T. YU.; Lenskaya, O. P.; Platonov, S. A.; Plyushchev, V. A.; Khitrov, M. L.; Radiotekhni-

ka; September 1995; ISSN 0033-8486, no. 9mbe, pp. 85-89; In Russian; Copyright; Avail: Issuing Activity

Description of the equipment for dynamic microwave and infrared thermomapping as well as the methods and preliminary data on the studies of the patients with various oncology diseases are presented. The investigations show that (1) the depth radiothermography in the decimeter wavelength band allows to observe the variations of thermal fields of the internal organs (lungs, kidneys et cetera) and gives an additional information about a tumour process character in using glucose loading and (2) the dynamic IR-mapping with using glucose loading allows to obtain information about thermal fields variations of surface-placed tumours of mamma, skin etc.

Author (EI)

Clinical Medicine; Imaging Techniques; Medical Services; Microwave Equipment; Microwaves; Radiometers; Thermography

19960035441; 96N30281 ManTech Environmental Technology, Inc., Dayton, OH USA

Reproductive Toxicity Screen of Ammonium Dinitramide Administered in the Drinking Water of Sprague-Dawley Rats ***Final Report, Oct. 1993 - Jul. 1994***

Kinkead, E. R., ManTech Environmental Technology, Inc., USA; Wolfe, R. E., ManTech Environmental Technology, Inc., USA; Flemming, C. D., ManTech Environmental Technology, Inc., USA; Leahy, H. F., ManTech Environmental Technology, Inc., USA; Caldwell, D. J., ManTech Environmental Technology, Inc., USA; Nov. 1995; 40p; In English

Contract(s)/Grant(s): F33615-90-C-0532; AF Proj. 6302

Report No.(s): AD-A303786; AL/OET-TR-1994-0162; WRAIR-TR-94-0015; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Department of Defense is currently considering replacing ammonium perchlorate with ammonium dinitramide (ADN). The ADN, a class 1.1 explosive oxidizer, will be used in solid rocket propellant mixtures and explosives. This study was intended to evaluate the potential of ADN to produce alterations in paternal fertility, maternal pregnancy and lactation, and growth and development of offspring. Male and female rats received drinking water treated with 2000, 1000, or 200 mg ADNIL throughout the study. Mating occurred following 14 days of treatment. All dams, one-half the males, and representative pups were maintained for a total of 90 days of treatment. No mortality occurred in parental animals during the study. Treatment of ADN resulted in no adverse effects on mating as 92-100% of the animals mated. No treatment-related effects were seen in parental animals clinically or histopathologically. Adverse treatment-related effects were noted in maternal and paternal fertility indices, gestational indices, and live birth indices in both the high- and mid-dose groups. Litter sizes in the high- and mid-dose groups were significantly smaller than those of the low-dose and control groups. Mean pup weights showed no statistically significant differences between ADN-treated pups and controls. Gross and histopath ological examination of the animals failed to identify the cause for the decrease in litter production in the high- and mid-dose dams. This study indicates that ADN is a reproductive toxicant. The no observable effect level is 289 mg/kg/day, the median dose of the low-level female rats.

DTIC

Rats; Ammonium Compounds; Oxidizers; Solid Rocket Propellants; Toxicity; Mortality; Fertility; Pregnancy; Reproduction (Biology)

19960035571; 96N30336 Science Applications International Corp., McLean, VA USA

An epidemiologic investigation of health effects in Air Force personnel following exposure to herbicides, Volume 10 ***Progress Report, May 1992 - 1995***

Grubbs, William D., Science Applications International Corp., USA; Wolfe, William H., Armstrong Lab., USA; Michalek, Joe E., Armstrong Lab., USA; Miner, Judson C., Armstrong Lab., USA; Henriksen, Gary L., Armstrong Lab., USA; Swaby, James A., Armstrong Lab., USA; Lustik, Michael B., Science Applications International Corp., USA; Brockman, Amy S., Science Applications International Corp., USA; Henderson, Scott C., Science Applications International Corp., USA; Burnett, Frank R., Science Applications International Corp., USA; May 02, 1995; 468p; In English

Contract(s)/Grant(s): F41624-91-C-1006

Report No.(s): AD-A304310; AL-TR-920107; SAIC Proj. 01-0813-02-3005; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Partial contents: Dependent Variable, Covariate Associations for the Immunology Assessment, Interaction Tables for the Immunology Assessment, Immunology Analysis Tables-Occupation Removed from Final Model, Interaction Tables for the Immunology Assessment, Occupation Removed from Final Model Dependent Variable,Covariate Associations for the Pulmonary Assessment Interaction Tables for the Pulmonary Assessment Pulmonary Analysis Tables, Occupation and Body Fat Removed from Final Model Interaction Tables for the Pulmonary Assessment, Occupation and Body Fat Removed from Final Model, Summary of Analysis Results, Graphical Presentations of Continuous Clinical Parameters versus Current Dioxin, The Dioxin Assay, Questionnaire Methodology, Physical examination Methodology, Study Selection and Participation, Quality Control, Statistical Methods, Covariate Associations with Estimates of Dioxin Exposure, General Health Assessment, Neoplasia Assessment, Neurological Assessment, Psychological Assessment, Gastrointestinal Assessment, Dermatologic Assessment, Cardiovascular Assessment, Hematologic Assessment, Renal Assessment, Endocrine Assessment, Immunologic Assessment, Pulmonary Assessment,

DTIC

Dependent Variables; Cardiovascular System; Endocrinology; Gastrointestinal System; Hematology; Immunology; Neurology; Statistical Analysis; Physical Examinations; Adipose Tissues

19960035572; 96N30337 Scripps Clinic and Research Foundation, La Jolla, CA USA

An Epidemiologic Investigation of Health Effects in Air Force Personnel Following Exposure to Herbicides., volume 9 ***Interim Report, May 1992 - May1995***

Grubbs, William D., Science Applications International Corp., USA; Wolfe, William H., Armstrong Lab., USA; Michalek, Joel E., Armstrong Lab., USA; Williams, David E., Scripps Clinic and Research Foundation, USA; Lustik, Michael B., Science Applications International Corp., USA; May 02, 1995; 473p; In English

Contract(s)/Grant(s): F41624-91-C-1006

Report No.(s): AD-A304311; AL-TR-920107-vol-9; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

Partial Contents: Dependent Variable-Covariate Associations for the Dermatologic Assessment; Interaction Tables for the Dermatologic Assessment; Dermatology Analysis Tables-Occupation Removed from Final Model Interaction Tables for the Dermatologic Assessment; Occupation Removed from Final Model; Dependent Variable-Covariate Associations for the Cardiovascular Assessment; Interaction Tables for the Cardiovascular Assessment; Cardiovascular Analysis Tables-Occupation; Body Fat; Total Cholesterol, HDL, and Diabetic Class Removed from Final Model; Interaction Tables for the Cardiovascular Assessment-Occupation; Total Cholesterol, HDL, and Diabetic Class Removed from Final Model; Dependent Variable-Covariate Associations for the Hematology Assessment; Interaction Tables for the Hematology Assessment; Hematology Analysis Tables-Occupation Removed from Final Model; Interaction Tables for the Hematology Assessment; Dependent Variable-Covariate Associations for the Renal Assessment Renal Analysis Tables-Occupation and Diabetic Class Removed from Final Model; Dependent Variable-Covariate Associations for the Endocrine Assessment; Interaction Tables for the Endocrine Assessment; Endocrine Analysis Tables-Occupation, HDL Cholesterol, and Cholesterol Removed from Final Model; Interaction Tables for the Endocrine Assessment-Occupation.

DTIC

Armed Forces (USA); Epidemiology; Herbicides; Cardiovascular System; Tables (Data)

19960035573; 96N30338 Scripps Clinic and Research Foundation, La Jolla, CA USA

An epidemiologic investigation of health effects in Air Force personnel following exposure to herbicides, Volume 4, 1992 Follow-up examination results ***Triennial Report, May 1992 - May 1995***

Grubbs, William D., Science Applications International Corp., USA; Lustik, Michael B., Science Applications International Corp., USA; Brockman, Amy S., Science Applications International Corp., USA; Henderson, Scott C., Science Applications International Corp., USA; Burnett, Frank R., Science Applications International Corp., USA; Land, Rebecca G., Science Applications International Corp., USA; Osborne, Dawn J., Science Applications International Corp., USA; Wolfe, William H., Armstrong Lab., USA; Michalek, Joe E., Armstrong Lab., USA; Miner, Judson C., Armstrong Lab., USA; May 02, 1995; 427p; In English

Contract(s)/Grant(s): F41624-91-C-1006; SAIC Proj. 01-0813-02-3005

Report No.(s): AD-A304313; AL-TR-920107; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Chloracne, a chronic acneiform eruption with a highly specific cutaneous distribution, was first described by Von Bettman in 1897 as an occupational disease in German industrial workers. It was not until 1957 that it became recognized as a very specific consequence of exposure to chlorophenols. A recent review article summarizes the unique clinical manifestations of this skin condition. Early animal researchers employed the rabbit's ear as a model for assaying the effects of chloracnegenic compounds. Other experiments on hairless mice produced histopathologic changes similar to those that occur in humans exposed to tetrachlorodibenzo- p-dioxin (TCDD, or dioxin) including hyperkeratotic changes in the sebaceous follicle with plugging of the orifice, hyperkeratinization of the stratum corneum, and keratin cyst formation. The earliest descriptions of chloracne-like disease date back to the turn of the century. It is a relatively rare dermatitis with fewer than 4,000 cases documented world-wide; most cases have occurred in chemical plant workers or in victims of industrial accidents. Chronic conditions associated with severe chloracne include actinic elastosis, acne scars, and hypertrichosis. Epidermoid inclusion cysts seen in biopsy spe cimens are considered pathognomonic. The occurrence and severity of chloracne appear to be dose-related but may depend on other factors including the route of adnnnistration, age, genetic predisposition, and the presence of acne vulgaris and other dermatoses. More recent studies in rats have documented that the extent of dermal absorption is inversely related to age. This observation may be relevant to the finding in the industrial explosion at Seveso, Italy, that most cases (170 of 193 exposed) of chloracne occurred in children.

DTIC

Occupational Diseases; Skin (Anatomy); Chronic Conditions; Dermatitis; Cysts; Herbicides; Exposure

19960035611; 96N30375 Donald Guthrie Foundation for Medical Research, Sayre, PA USA

Ethanol disruption of synaptic neurotransmission, ***22 Sep. 1994 - 1 Sep. 1995***

Aronstam, Robert S., Donald Guthrie Foundation for Medical Research, USA; Oct. 1995; 113p; In English
Contract(s)/Grant(s): DAMD17-94-J-4011
Report No.(s): AD-A303734; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The goal of this research is to understand how acute and chronic ethanol administration disrupts synaptic transmission in the central nervous system. The underlying hypothesis is that ethanol depresses neurotransmission at neurotransmitter receptors by altering receptor- G protein interactions. The results provide partial support for our hypothesis. However, ethanol's actions were not universal, and receptor subtypes were not equally affected. The significance of ethanol's actions is indicated by the disruption of signaling processes (adenylate cyclase, intracellular Ca2+, cell adhesion). Ethanol disrupted the following processes: (1) receptor-G protein interactions as seen in ligand binding studies in receptors expressed by stably transfected CHO cells; (2) muscarinic receptor control of G protein GTPase activity and guanine nucleotide binding in brain tissues; (3) the balance between inhibitory and stimulatory G protein influences on adenylate cyclase, (4) Ca2+ responses of ml and m5 receptors; (5) muscarinic mediated cell adhesion response in a non-neuronal cell line. The quantity of experimental material has been a limiting factor in studies with cultured cells. We initiated studies on the influence of chronic ethanol treatment on neurotransmitter receptors, including the adoption of Western blots (G proteins) and Northern blots for receptor niRNA. to analyze control of recepto r expression, the promoter regions of ml-m5 were cloned, sequenced and characterized.
DTIC
Ethyl Alcohol; Cells (Biology); Neurotransmitters; Central Nervous System; Proteins; Neurophysiology

19960035669; 96N30426 Chicago Univ., Dept. of Medicine. Section of Endocrinology., Chicago, IL USA
Basic Mechanisms and Implications of Non-Photic Entrainment of Circadian Rhythmicity ***Final Report, 1 Sept. 92 - 31 Aug. 95***
VanCouter, Eve, Chicago Univ., USA; Aug. 31, 1995; 8p; In English
Contract(s)/Grant(s): F49620-92-J-0347
Report No.(s): AD-A303756; AFOSR-TR-96-0043; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Mrs. Wisor and Lowery have been primarily involved in studies which seek to determine the effects of light on the expression of late response genes in the SCN. The VGF gene was identified in a screen for mRnAs induced by nerve growth factor in PCl2 cells. The gene encodes a 90 KDa protein of unknown function that has been localized immunocytochemically to the rodent circadian pacemaker, the suprachiasmatic nucleus (SCN). We hypothesized that light pulses would induce VGF expression in the SCN. Vgf is induced at the mRNA level by a light pulse in the subjective night, a time when a light pulse also induces a behavioral phase shift. Interestingly, the induction of VGF does not appear to be an immediate early response, as it is detectable for at least 3-6 hrs following a light stimulus. Furthermore, VGF induction by light is blocked by anisomycin, a protein synthesis inhibitor. Thus, VGF appears to be a late response gene that is regulated both by the circadian clock and by light.
DTIC
Circadian Rhythms; Clocks; Growth; Proteins; Night; Behavior; Inhibitors; Rodents; Psychological Factors; Luminaires

19960035690; 96N30446 State Univ. of New York, Plattsburgh, NY USA
Scientific basis of noise-induced hearing loss ***Final Report, 13 Jun. 1994 - 12 Jun. 1995***
Hamernik, Roger P., State Univ. of New York, USA; 1996; 486p; In English; 5th; International Symposium of Effects of Noise on Hearing, 12-14 May 1994, Goetberg, Sweden
Contract(s)/Grant(s): DAMD17-94-J-4199
Report No.(s): AD-A304194; ISBN 0-86577-596-6; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Biological Basis of Noise-Induced Hearing Loss, Sensory Cell Regeneration and Functional Recovery, The Effects of Acoustic Trauma, Other Cochlear Injury, and Death on Basilar-Membrane Responses to Sound, Excito-toxicity and Plasticity of IHC-Auditory Nerve Contributes to Both Temporary and Permanent Threshold shift, Noise-Induced Expression of Heat Shock Proteins in the Cochlea, Changes in Gene Expression Following Temporary Noise-Induced Threshold Shift, Genetic Susceptibility to Noise-Induced Hearing Loss in Mice, Effects of Acoustic Over stimulation on Distortion-Product and Transient-Evoked Otoacoustic Emissions, Physiological Correlates of Spontaneous Otoacoustic Emissions Induced by Acoustic Trauma, Cochlear Blood Flow Changes With Short Sound Stimulation,Individual Differences in Peripheral Sound Transfer Function, Relationship t o NIHL, Experimental Studies of Noise-Induced Hearing Loss Underwater Hearing and Occupational Noise Exposure Threshold Shift Dynamics Following Interrupted Impact or Continuous Noise Exposure: A Review,Protection from Continuous, Impact, or Impulse Noise Provided by Prior Exposure to Low-Level Noise, Efferent and Priming Modulation of Noise-Induced Hearing Loss, Protection Against Temporary and Permanent Noise-Induced Hearing Loss by Sound Conditioning Psychophysical and Evoked Response Studies of Aged Subjects: Masking by Low-Pass Noise, Interactions Between Age-Related and Noise-Induced Hearing Loss, Application of Frequency and Time Domain Kurtosis to Assessment of Complex, Time-Varying Noise Exposures,
DTIC

Age Factor; Auditory Defects; Noise Threshold; Noise Reduction; Continuous Noise; Sound Waves; Sound Intensity; Bioacoustics; Cochlea; Conferences

19960035826; 96N30531 Science Applications International Corp., McLean, VA USA

An Epidemiologic Investigation of Health Effects in Air Force Personnel Following Exposure to Herbicides. Extract ***Interim Report, May 1992 - May 1995***

Grubbe, William D., Science Applications International Corp., USA; Wolfe, William H., Armstrong Lab., USA; Michalek, Joel E., Armstrong Lab., USA; Williams, David E., Scripps Clinic and Research Foundation, USA; Lustik, Michael B., Science Applications International Corp., USA; May 02, 1995; 50p; In English

Contract(s)/Grant(s): F41624-91-C-1006

Report No.(s): AD-A304307; AL-TR-920107; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report represents the results from an epidemiologic study to determine whether adverse health effects attributable to Herbicide Orange exist in Vietnam veterans who participated in Operation Ranch Hand. Data were analyzed for 12 clinical areas. The analysis focused on group differences between the exposed (Ranch Hand) and unexposed (Comparison) cohorts, as well as on the association of each health-related endpoint with extrapolated initial and current serum dioxin levels. Findings in this report reveal a consistent relationship between dioxin and body fat that was initially noted in the analysis of the 1987 examination results. Cholesterol and the cholesterol to HDL ratio were found to be associated with current serum dioxin levels. Evidence for a possible association between glucose intolerance, impaired insulin production, and dioxin exposure was revealed, but cause and effect remain to be established. Also revealed was a significant association between selected peripheral pulses and dioxin exposure, and a significant difference in self-perceived health status between Ranch Hands and Comparisons (although possible due to bias). Other health endpoints revealed no consistent patterns within or across clinical areas that were suggestive of health detriment due to dioxin exposure

DTIC

Flying Personnel; Health; Herbicides; Ratios; Exposure; Epidemiology; Adipose Tissues

19960035844; 96N30545 Defence Science and Technology Organisation, Ship Structures and Materials Div., Canberra, Australia

Guidelines for Safe Handling of Toxins

Szilagyi, Maria, Defence Science and Technology Organisation, Australia; Nov. 1995; 16p; In English

Report No.(s): AD-A304205; DSTO-TR-0247; DODA-AR-009-385; Copyright Waived; Avail: CASI; A03, Hard–copy; A01, Microfiche

Toxins are highly toxic chemicals which cause illness through all routes of entry into the body. This technical note has been prepared to ensure that preparation, handling, and disposal of toxins does not constitute a greater occupational hazard than is necessary. It includes hazards that may be encountered and the precautions that should be taken against such hazards.

DTIC

Toxins and Antitoxins; Toxicity; Disposal

19960035846; 96N30547 Armstrong Lab., Brooks AFB, TX USA

Hepatotoxic Substances Commonly Used at Air Force Bases ***Final Report, Jan. - Dec. 1995***

Maull, Elizabeth A., Armstrong Lab., USA; Jacobsen, Joann M., Armstrong Lab., USA; Jan. 1996; 64p; In English

Report No.(s): AD-A303892; AL/OE-SR-1995-0024; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The Environmental Sciences Branch of the Armstrong Laboratory Occupational Medicine Division (AL/OEMH) was requested to provide hepatotoxicity data on a list of chemicals commonly used at Air Force bases. Information has been obtained from various databases, including the NIOSH Pocket Guide to Chemical Hazards, EPA's Integrated Risk Information System (IRIS), and the Hazardous Substances Database (HSDB). This report includes information on target tissues, carcinogenicity classification, occupational exposure limits, appropriate medical surveillance, and populations at special risk as well as potential for hepatotoxicity.

DTIC

Military Air Facilities; Medical Science; Medical Services; Carcinogens; Information Systems

19960036502; 96A66341

Antibiotic loaded hydroxyapatite osteoconductive implant material - in vitro release studies

Paul, W., SRee Chitra Tirunal Inst for Medical Sciences and Technology, India; Sharma, C. P.; Journal of Materials Science Letters; December 15 1995; ISSN 0261-8028; vol. 14, no. 24, pp. 1792-1794; In English; Copyright; Avail: Issuing Activity

Bioactive hydroxyapatite (HA) ceramic granules have been used clinically as substitute for autograft, for filling the bone tumors. Unlike other bone implant materials, HA is biocompatible, non-toxic and resorbable, having excellent osteoconductive ability, possesses structure similar to bone mineral and can form direct bonds with bone. This paper investigates the release behavior of antibiotics incorporated into porous hydroxyapatite spheres in vitro and examines the possible use of chitosan, collagen, phosphatidycholine and poly (lactic acid) for controlling release of the drug. Ampicillin is used as a model antibiotic.

Author (EI)

Antibiotics; Ceramics; Chlorine Compounds; Drugs; Implantation; Phosphates; Surgery

19960038283; 96N30762 Harvard Univ., Cambridge, MA USA

Structural Analysis of the Human T-Cell Receptor/HLA-A2/Peptide Complex ***Annual Report, 1 Sep. 1994 - 31 Aug. 1995***

Wiley, Don C., Harvard Univ., USA; Garboczi, David N., Harvard Univ., USA; Sep. 30, 1995; 13p; In English

Contract(s)/Grant(s): DAMD17-94-J-4060

Report No.(s): AD-A304789; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

During the first year of the grant, we obtained sufficient amounts of the T-cell receptor (TCR) for crystallization experiments. This was achieved by protein engineering and by protein refolding experiments. The refolded TCR is now readily obtained in large amounts. The refolded TCR binds to its specific peptide/HLA-A2 complex as detected by native polyacrylamide gel electrophoresis. The ternary complex of TCR/HLA-A2/peptide forms large moderately-well diffracting crystals. We have collected a 3.3 Angstrom dataset and are in the process of determining the structure of the complex to the limit of our data. This structural determination of the T-cell receptor/HLA-A2/peptide complex should allow a detailed understanding of this central molecular recognition event in the immune system.

DTIC

Proteins; Crystallization; Peptides; Cells (Biology); Cancer

19960038333; 96N30809 Institute for Human Factors TNO, Soesterberg, Netherlands

Climate and work load both interact with individual characteristics in determining the human heat stress response

Havenith, G., Institute for Human Factors TNO, Netherlands; Coenen, J. M. L, Institute for Human Factors TNO, Netherlands; Kistemaker, J. A., Institute for Human Factors TNO, Netherlands; Dec. 08, 1995; 31p; In English

Contract(s)/Grant(s): B95-003

Report No.(s): TD 95-1495; TNO-TM 1995 B-14; Copyright; Avail: Issuing Activity (TNO Human Factors Inst. Kampweg 5, P. O. Box 23, 3769 ZG Soesterboerg, The Netherlands), Hardcopy, Microfiche

A model compares climate to the physiological responses and tolerances of human subjects undergoing physical activity. The subjects were exposed for times between 75 and 90 minutes to a constant climate while the worked on a cycle ergometer. The testing climates ranged from a cool (21 C) environment with 50% relative humidity to warm and humid (35 C, 80%rh) to hot and dry (45 C, 20%rh).

CASI

Climate; Humidity; Physiological Responses; Heat Tolerance; Human Tolerances; Anthropometry

53
BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19960033272; 96N30076 Japan Society of Aerospace and Environmental Medicine, Tokyo, Japan

Japanese Journal of Aerospace and Environmental Medicine, Volume 32, No.3

Mano, Tadaaki, Editor, Japan Society of Aerospace and Environmental Medicine, Japan; Asukata, Ichiro, Editor, Japan Society of Aerospace and Environmental Medicine, Japan; Sep. 1995; ISSN 0387-0723; 54p; In Mixed; In Japanese; In English; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Contents include articles on the extremely low prevalence of non-insulin dependent diabetes among cockpit crews of Japanese airlines; the effects of exercise on calcium metabolism in simulated weightlessness, and hemodynamic estimation of G levels for a short-arm centrifuge in the Space Station. Abstracts of aerospace medicine related articles from other publication sources are appended.

Derived from text

Aerospace Medicine; Weightlessness Simulation; Airline Operations; Calcium Metabolism; Insulin; Space Stations; Centrifuges; Metabolic Diseases; Diabetes Mellitus

19960034230; 96N30113 Armstrong Lab., Brooks AFB, TX USA

The Effects of Rater Training and Practice and Feedback on the Accuracy of Behavioral Observation and Performance Ratings ***Interim Report, Jan. 1992 - Dec. 1994***

Cesare, Steven J., County of San Diego, USA; Dickinson, Terry L., Old Dominion Univ., USA; Jun. 1995; 154p; In English

Contract(s)/Grant(s): AF Proj. 1121

Report No.(s): AD-A303762; AL/HR-TP-95-0011; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The purpose of this research was to investigate the effects of training method and amount of training and feedback on the accuracy of performance rating and behavioral observation. Results indicated that frame-of-reference training produced the most accurate performance rating, cognitive modeling training was the most effective training strategy m reducing the raters 1-hit rates, and practice-and-feedback failed to improve either observation or rating accuracy. Interpretation and suggestions for future research are discussed.

DTIC

Performance Prediction; Education; Learning; Assessments; Ratings; Cognition; Training Evaluation

19960035565; 96N30330 Armstrong Lab., Aerospace Medicine Directorate; Clinical Sciences Div.; Neuropsychiatry Branch., Brooks AFB, TX USA

Cognitive assessment of USAF pilot training candidates: Multidimensional Aptitude Battery and CogScreen-Aeromedical edition ***Interim Report, Mar. 1994 - Aug. 1995***

Callister, Joseph D., Armstrong Lab., USA; King, Raymond E., Armstrong Lab., USA; Retzlaff, Paul D., Armstrong Lab., USA; Aug. 1995; 23p; In English

Report No.(s): AD-A303388; AL/AO-TR-1995-0125; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Most intellectual and cognitive assessment of pilots is done with locally developed assessment devices. This paper presents the test scores of 537 USAF pilot training candidates who were tested with commercially available, 'off-the-shelf' products. Multidimensional Aptitude Battery subscale scores and summary intelligence scores were found to be well above average. Data from the new CogScreen (Aeromedical Edition) is also provided and shows consistent differences between pilot training candidates and commercial pilots across reaction time, accuracy, throughput, and process measures.

DTIC

Aerospace Medicine; Cognitive Psychology; Pilot Training

19960035578; 96N30343 Armstrong Lab., Human Resources Directorate; Manpower and Personnel Research Div., Brooks AFB, TX USA

Differential assignment potential in the ASVAB: A simulation of job performance gains ***Interim Report, Jan. 1992 - Dec. 1994***

Alley, William E., Armstrong Lab., USA; Teachout, Mark S., Armstrong Lab., USA; Jun. 1995; 13p; In English

Contract(s)/Grant(s): AF Proj.1121

Report No.(s): AD-A303593; AL/HR-TP-1995-0006; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The classification potential of the Armed Services Vocational Aptitude Battery (ASVAB) to improve military performance has been the subject of recent controversy. At issue is whether the ASVAB can be configured to provide differential classification value. A simulation study was conducted in which Air Force recruits (N=1250) from eight job specialties were 'reassigned' to optimize overall job performance based on their ASVAB test scores. Results from the optimal reassignment yielded average expected performance gains that were 1/2 of a standard deviation unit above that obtained in a random allocation. The performance gain over the current assignment baseline was 1/3 of a standard deviation unit. These gains were equivalent to those that would have been produced if recruits had been given an additional 14 months of technical experience. Implications for force planning were discussed.

DTIC

Human Performance; Computerized Simulation; Standard Deviation; Classifications

19960035579; 96N30344 Armstrong Lab., Human Resources Directorate; Manpower and Personnel Research Div., Brooks AFB, TX USA

Cognitive technology extends the work environment and accelerates learning in complex jobs ***Interim Report, May 1993 - Nov. 1993***

Gott, Sherrie P., Armstrong Lab., USA; Sep. 1995; 25p; In English; 1st; International Cognitive Technology Conference, 24-27 Aug. 1995, Hong Kong, China

Contract(s)/Grant(s): AF Proj. 2949

Report No.(s): AD-A303597; AL/HR-TP-1995-0025; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Instructional technology that is grounded in cognitive theory is used as the medium to accelerate the acquisition ot complex problem solving skills. The use of an intelligent tutoring system to teach troubleshooting literally expands the learning environment by providing a simulated representation of the actual work environment where trainees work a graded series of troubleshooting scenarios. Scenarios are sequenced t9 promote successive approximations of mature practice as trainees work more and more difficult problems in the 'forgiving' tutor environment, where they learn by doing and reflecting on their own solution vis-a-vis an exemplar master solution. In a controlled experiment, experimental apprentice subjects outperformed their control counterpart on the two Verbal Troubleshooting Posttests (t39= -4.04, p = .000; t39 = -3.72, p = .001) and on the paper and pencil posflest (r39 = -2.77, p = .009). After tutoring, scores obtained by apprentice subjects (having about 3 years' AF experience) rivaled those of Master technicians having over 10 years' experience in F 15 avion ics maintenance. The dramatic results are attributed to (a) cognitive models as input to instruction; (b) the sequence of instructional events; (c) situated learning in a constructivist instructional environment, and (d) the sociology surrounding the learning system. Topics (c) and (d) are discussed with special attention.

DTIC

Problem Solving; Verbal Communication; Education; Avionics; Computerized Simulation; Human Performance; Computer Assisted Instruction

19960035672; 96N30429 Armstrong Lab., Human Resources Directorae; Technical Training Research Div., Brooks AFB, TX USA

Extending the Training Efficiency and Effectiveness Methodology (TEEM) with training transfer data ***Interim Report, Aug. 1992 - Dec. 1994***

Teachout, Mark S., Air Force Human Resources Lab., USA; Sego, Douglas J., Hong Kong Univ. of Science and Technology, Hong Kong; Ford, J. Kevin, Michigan State Univ., USA; Jun. 1995; 14p; In English

Contract(s)/Grant(s): AF Proj.1121
Report No.(s): AD-A303559; AL/HR-TP-1995-0015; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Although the most popular framework for depicting training evaluation has been Kirkpatrick's four-stage process of reactions, learning, behavior, and results, this framework offers no specific mechanism for making changes to training courses. However, the systems approach to training depicts evaluation as a key component that provides feedback to the needs assessment, design, development and delivery stages of training to continuously update and improve the entire training process. Despite these conceptual models, little research has been conducted to develop methodologies for using training evaluation information to make training course changes. One exception is the work of Ford & Wroten who developed a Matching Technique that compares, or matches, training needs to the emphasis placed on tasks in a training program. The Matching Techn ique has previously been used in the Training Efficiency and Effectiveness Methodology (TEEM) and combines efficiency and effectiveness data for course redesign. The purpose of this paper is to extend the TEEM through the integration of information about the efficiency, effectiveness and transfer of training for training system redesign. The TEEM was applied to a mechanic's training course. Efficiency results produced by the Matching Technique was integrated with follow-up task performance effectiveness and opportunity to perform data collected from training graduates and their supervisors 8 months after the completion of training. The integration of these data into the TEEM for training system re-design was illustrated.
DTIC
Training Evaluation; Transfer of Training; Education; Human Performance; Decision Making; Abilities; Personnel Development; Classes

19960035678; 96N30434 Armstrong Lab., Brooks AFB, TX USA
Assessment of Configurational Knowledge of Naturally- and Artificially-Acquired Large-Scale Space *Interim Report, Oct. 1993 - Dec. 1993*
Regian, J. W., Armstrong Lab., USA; Yadrick, Robert M., Armstrong Lab., USA; Nov. 1995; 33p; In English
Contract(s)/Grant(s): AF Proj. 2313
Report No.(s): AD-A303456; AL/HR-TP-1995-0030; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We report on two studies designed to explore subjects' performance in learning and assessing knowledge of artificial and real world environments. Experiment (1) established norms for supporting materials used in Experiment (2) Subjects in Experiment 2 learned an artificial (computer based) environment that was either randomly or prototypically configured then performed several tasks intended to assess their configurational knowledge of the environment The results showed that subjects were able to derive configurational knowledge from either random or the prototypical condition. However, configurational knowledge was better in the random condition than in the prototypical condition. We also found that subjects' configurational knowledge was, in general, functionally similar to their knowledge of a real world environment. Assessment, Spatial filtering, Spatial reasoning.
DTIC
Environments; Spatial Filtering

19960035832; 96N30535 Galaxy Scientific Corp., Lackland AFB, TX USA
Interface, instructional approach, and domain learning with a mathematics problem-solving environment *Interim Report, Oct. 1993 - Dec. 1993*
Yadrick, Robert M., Armstrong Lab., USA; Regian, J. Wesley, Armstrong Lab., USA; Robertson-Schule, Linda, Galaxy Scientific Corp., USA; Gomez, Catherine Connolly, Galaxy Scientific Corp., USA; Nov. 1995; 24p; In English
Contract(s)/Grant(s): F41622-92-D-0006; AF Proj. 2313
Report No.(s): AD-A303561; AL/HR-TP-1995-0032; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We conceptualize Computer-Based Instruction (CBI) as involving both a primary task, learning to use a particular domain, and a secondary task, learning to use instructional approach embodied in a computer system and to manipulate its interface. We argue that the complexity and compatibility of the instructional approach and the interface separately and interactively influence the ease with which students are able to learn the subject matter. Examples from previous research show how looking at CBI in this way provides a framework for better understanding the results of some previous studies of CBI and CBI-related interface design. We also describe an experimental methodology for dissociating and measuring the separate relative effect on learning of using a CBI system for mathematics word problems. Finally, we report on an experiment with low-ability, remedial subjects that used this methodology to examine pretest post test differences due to each component.
DTIC
Computer Assisted Instruction; Problem Solving; Performance Tests

19960035839; 96N30541 Galaxy Scientific Corp., Lackland AFB, TX USA
Individual and cooperative group learning with user-controlled and program-controlled mathematics tutors *Interim Report, Oct. 1993 - Dec. 1993*
Yadrick, Robert M., Armstrong Lab., USA; Regian, J. Wesley, Armstrong Lab., USA; Gomez, Cathrine Connolly, Galaxy Scientific Corp., USA; Robertson-Schule, Linda, Galaxy Scientific Corp., USA; Nov. 1995; 30p; In English
Contract(s)/Grant(s): F41622-92-D-0006; AF Proj. 2313
Report No.(s): AD-A303591; AL/HR-TP-1995-0031; No

Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We used a 2x2 design to compare the performance of remedial subjects learning to solve mathematics word problems. Subjects worked either alone or as a member of a dyadic cooperative group, and received up to 12 hours of instruction and practice, using either a 'problem-solving environment' over which the user exercised considerable control or a directive, sometimes intrusive tutor. Individual subjects who worked with the problem-solving environment showed the largest average improvement between pretest and post test scores. Group members showed moderate improvements after working with the directive tutor. There were no significant changes between pretest and post test for either group members who worked with the problem-solving environment or for individuals who worked with the directive tutor.

DTIC

Problem Solving; Performance Tests

19960035869; 96N30565 Japan Broadcasting Corp., Human Vision Research Div., Tokyo, Japan

Self-organizing feature map with spatial position and spatial frequency information

Nakagawa, Toshio, Japan Broadcasting Corp., Japan; Ito, Takayuki, Japan Broadcasting Corp., Japan; Oct. 1994; ISSN 0027-657X; 15p; In English

Report No.(s): NHK-Lab-Note-429; Copyright; Avail: Issuing Activity (Japan Broadcasting Corp., 1-10-11, Kinuta, Setagaya, Tokyo, 157 Japan), Hardcopy, Microfiche

The representation of spatial frequency information in biological and artificial vision systems is discussed. In order to explore the representing style, an approach using the self-organization of feature maps from a retina-like input filter set is proposed. Finally, a computerized simulation of self-organization for one-dimensional data is shown.

Author (revised)

Spatial Resolution; Visual Perception; Image Processing; Computer Vision

19960036897; 96N30587 Naval Medical Research Inst., Bethesda, MD USA

Quantification of Special Operations Mission-Related Performance: Cognitive Measures ***Progress Report, Jan. 1994 - Sep. 1995***

Thomas, John R., Naval Medical Research Inst., USA; Schrot, John, Naval Medical Research Inst., USA; Dec. 01, 1995; 68p; In English

Contract(s)/Grant(s): Navy Proj. 407BB

Report No.(s): AD-A304122; NMRI-95-78; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In order to evaluate the impact of thermal and physical stress on mission-related performance in a quantifiable fashion, and to develop a technology to minimize the effects of such stresses, it has become important to develop standardized measures of mission-related performance. The present report presents fundamental information relating to the selection of measures to assess the impact of operational stressors on cognitive performance. The initial cognitive performance abilities presently considered and adopted for standardized measurement in thermally and physically stressful operational environments are: memory, reaction time, vigilance, calculations, logical reasoning, and learning. The six currently adopted measures of cognitive performance are matching-to-sample, complex reaction time, visual vigilance, serial addition-subtraction, logical reasoning, and repeated acquisition. The measures have been implemented in a standardized manner on portable battery-operated computers for use in both laboratory and field settings. The report provides detailed documentation for each of the measures, including computer code listings.

DTIC

Cognition; Thermal Stresses; Stress (Physiology); Human Performance; Computer Programs

19960036911; 96N30599 Navy Personnel Research and Development Center, San Diego, CA USA

Methods for Conducting Cognitive Task Analysis for a Decision Making Task ***Interim Report, Jan. 1992 - Oct. 1994***

Randel, Josephine M., Naval Personnel Research and Development Center, USA; Pugh, H. Lauren, Naval Personnel Research and Development Center, USA; Wyman, Barbara G., Naval Personnel Research and Development Center, USA; Jan. 1996; 34p; In English

Report No.(s): AD-A304110; NPRDC-TN-96-10; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Cognitive task analysis (CTA) improves traditional task analysis procedures by analyzing the thought processes of performers while they complete a task. For this report, we have selected several of the measures for which we found differences in experts and novices and have detailed the procedures for using these methods to conduct a CTA for domains which involve critical decision making tasks in naturalistic settings. The cognitive task analysis methods that we describe are: (1) development of a task process model, (2) development of an information flow model, (3) misconceptions analysis, and (4) structural knowledge analysis. For each of these methods we describe how information is gathered (knowledge elicitation), how it is represented in a format that can be later used in designing training (knowledge representation), and how the knowledge can be used in developing training.

DTIC

Decision Making; Cognition; Knowledge Representation

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19960033220; 96N30034 Crew Systems Consultants, San Marcos, TX USA

Helmet-Mounted Display Symbology and Stabilization Concepts

Newman, Richard L., Crew Systems Consultants, USA; Jun. 1995; 115p; In English

Contract(s)/Grant(s): NAS2-13811

Report No.(s): NASA-CR-196697; A-950073; NAS 1.26: 196697; AD-A303212; USAATCOM-TR-94-A-021; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The helmet-mounted display (HMD) presents flight, sensor, and weapon information in the pilot's line of sight. The HMD was developed to allow the pilot to retain aircraft and weapon information and to view sensor images while looking off boresight.

DTIC

Helmet Mounted Displays; Line of Sight; Display Devices

19960033280; 96N30081 NASA Johnson Space Center, Houston, TX USA

Control System for Prosthetic Devices

Bozeman, Richard J., Inventor, NASA Johnson Space Center, USA; Jan. 02, 1996; 11p; In English; Division of US-Patent-Appl-SN-937325, filed 31 Aug. 1992 (US-Patent-5,376,128) Patent Info.: NASA-Case-MSC-21941-2; US-Patent- 5,480,454; US-Patent-Appl-SN-282843; US-Patent-Appl-SN-937325; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A control system and method for prosthetic devices is provided. The control system comprises a transducer for receiving movement from a body part for generating a sensing signal associated with that of movement. The sensing signal is processed by a linearizer for linearizing the sensing signal to be a linear function of the magnitude of the distance moved by the body part. The linearized sensing signal is normalized to be a function of the entire range of body part movement from the no-shrug position of the moveable body part through the full-shrg position of the moveable body part. The normalized signal is divided into a plurality of discrete command signals. The discrete command signals are used by typical converter devices which are in operational association with the prosthetic device. The converter device uses the discrete command signals for driving the moveable portions of the prosthetic device and its sub-prosthesis. The method for controlling a prosthetic device associated with the present invention comprises the steps of receiving the movement from the body part, generating a sensing signal in association with the movement of the body part, linearizing the sensing signal to be a linear function of the magnitude of the distance moved by the body part, normalizing the linear signal to be a function of the entire range of the body part movement, dividing the normalized signal into a plurality of discrete command signals, and implementing the plurality of discrete command signals for driving the respective moveable prosthesis device and its sub-prosthesis.

Official Gazzette of the U.S. Patent and Trademark

Prosthetic Devices; Transducers; Controllers; Motion

19960034220; 96N30103 Naval Postgraduate School, Monterey, CA USA

Soviet Visual Perception Research: Application to Target Acquisition Modeling

Lind, Judith H., Naval Postgraduate School, USA; Dec. 1995; 72p; In English

Report No.(s): AD-A303768; NPS-OR-95-015; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Five Soviet books have been reviewed to ascertain how target acquisition was modeled in the former Soviet Union and to determine if information is sufficient to program a comprehensive model. Authors include V.D. Glezer and K.N. Dudicin of the Pavlov Institute of Physiology, St. Petersburg. Since the books (published between 1961 and 1985) were machine-translated from the Russian, some original concepts may have not been correctly interpreted. Still, they provide an excellent overview of 30 years of vision research at the Pavlov Institute and of Russian thought on vision and the brain. The Soviet texts emphasize cognitive mechanisms of vision more than is common in U.S. military models. Mental models and the observer's mindset are considered very important. More emphasis is given to modeling recognition and identification (versus detection) than in the U.S. The result of this study is a sketchy and incomplete search and target acquisition model, unsuitable for programming at present. The reviewed books mostly provide information about vision in general, with emphasis on proposed neurophysiological and psychological processes that may explain experimental results. They obviously were not written with computer programs in mind. Extensive data collection would be required to quantify the Soviet vision concepts for use in a computer model.

DTIC

Target Acquisition; Texts; Brain; Computerized Simulation; Visual Perception; Neurophysiology; Cognition; Learning; Mental Performance; Operator Performance

19960034340; 96N30203 NASA Marshall Space Flight Center, Huntsville, AL USA

Selectively Lockable Knee Brace

Myers, W. Neill, Inventor, NASA Marshall Space Flight Center, USA; Shadoan, Michael D., Inventor, NASA Marshall Space Flight Center, USA; Forbes, John C., Inventor, NASA Marshall Space Flight Center, USA; Baker, Kevin J., Inven-

tor, NASA Marshall Space Flight Center, USA; Rice, Darron C., Inventor, NASA Marshall Space Flight Center, USA; Feb. 13, 1996; 6p; In English; Also announced as 19940032331
Patent Info.: NASA-Case-MFS-28991-1; US-Patent-5,490,831; US-Patent-Appl-SN-252032
Report No.(s): US-Patent-Class-602-26; US-Patent-Class-602-16; US-Patent-Class-623-44; Int-Patent-Class-A61F-5/00; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A knee brace for aiding in rehabilitation of damaged leg muscles includes upper and lower housings normally pivotable one relative to the other about the knee joint axis of a patient. The upper housing is attachable to the thigh of the patient above the knee joint while the lower housing is secured to a stirrup which extends downwardly along the patient's leg and is attached to the patient's shoe. An actuation rod is carried within the lower housing and is coupled to a cable. The upper and lower housings carry cooperative clutch/brake elements which normally are disengaged to permit relative movement between the upper and lower housings. When the cable is extended the clutch/brake elements engage and lock the housings together. A heel strike mechanism fastened to the stirrup and the heel of the shoe is connected to the cable to selectively extend the cable and lock the brace in substantially any position when the patient places weight on the heel.
Official Gazzette of the U.S. Patent and Trademark
Knee (Anatomy); Muscles; Supports; Prosthetic Devices

19960034389; 96N30233 California Univ., Graduate Div.; Mechanical Engineering Dept., Davis, CA USA
Measurement of human pilot dynamic characteristics in flight simulation ***Final Report***
Reedy, James T., California Univ., USA; 1987; 95p; In English
Contract(s)/Grant(s): NCC2-241
Report No.(s): NASA-CR-201099; NAS 1.26:201099; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Fast Fourier Transform (FFT) and Least Square Error (LSE) estimation techniques were applied to the problem of identifying pilot-vehicle dynamic characteristics in flight simulation. A brief investigation of the effects of noise, input bandwidth and system delay upon the FFT and LSE techniques was undertaken using synthetic data. Data from a piloted simulation conducted at NASA Ames Research Center was then analyzed. The simulation was performed in the NASA Ames Research Center Variable Stability CH-47B helicopter operating in fixed-basis simulator mode. The piloting task consisted of maintaining the simulated vehicle over a moving hover pad whose motion was described by a random-appearing sum of sinusoids. The two test subjects used a head-down, color cathode ray tube (CRT) display for guidance and control information. Test configurations differed in the number of axes being controlled by the pilot (longitudinal only versus longitudinal and lateral), and in the presence or absence of an important display indicator called an 'acceleration ball'. A number of different pilot-vehicle transfer functions were measured, and where appropriate, qualitatively compared with theoretical pilot- vehicle models. Some indirect evidence suggesting pursuit behavior on the part of the test subjects is discussed.
Author
Flight Simulation; Fast Fourier Transformations; Least Squares Method; Pilot Performance

19960034412; 96N30249 Korean Atomic Energy Research Inst., Daeduk, Korea, Republic of
The development of human factors technologies -The development of human behaviour analysis techniques
Lee, Jung Woon, Korean Atomic Energy Research Inst., Korea, Republic of; Lee, Yong Heui, Korean Atomic Energy Research Inst., Korea, Republic of; Park, Keun Ok, Korean Atomic Energy Research Inst., Korea, Republic of; Chun, Se Woo, Korean Atomic Energy Research Inst., Korea, Republic of; Suh, Sang Moon, Korean Atomic Energy Research Inst., Korea, Republic of; Park, Jae Chang, Korean Atomic Energy Research Inst., Korea, Republic of; Jul. 1995; 305p; In Korean
Report No.(s): KAERI-RR-1490/94; DE96-614974; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

In order to contribute to human error reduction through the studies on human-machine interaction in nuclear power plants, this project has objectives to develop SACOM(Simulation Analyzer with a Cognitive Operator Model) and techniques for human error analysis and application. In this year, we studied the followings: (1) The development of SACOM: (a) Site investigation of operator tasks, (b) Development of operator task micro structure and revision of micro structure, (c) Development of knowledge representation software and SACOM prototype, (d) Development of performance assessment methodologies in task simulation and analysis of the effects of performance shaping factors. (2) The development of human error analysis and application techniques: (a) Classification of error shaping factors(ESFs) and development of software for ESF evaluation, (b) Analysis of human error occurrences and revision of analysis procedure, (c) Experiment for human error data collection using a compact nuclear simulator, (d) Development of a prototype data base system of the analyzed information on trip cases.
Author(DOE)
Man Machine Systems; Computer Programs; Error Analysis; Data Bases; Computerized Simulation

19960035458; 96N30292 Armstrong Lab., Brooks AFB, TX USA
Effect of Haze in Advanced Laser Eye Protection Visors on Contrast Acuity ***Final Report, Feb. - Oct. 1995***
Kang, Robert N., Armstrong Lab., USA; LaPage, Connie S., Armstrong Lab., USA; Cora, Steven R., Armstrong Lab.,

USA; Jan. 1996; 20p; In English
Contract(s)/Grant(s): AF Proj. 2830
Report No.(s): AD-A304208; AL/OE-TR-1996-0002; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Laboratory tests were conducted to evaluate the effects of haze in FV-6MR and FV-7 advanced laser eye protection (ALEP) visors on vision. Preliminary results from early operational assessment (EOA) flight tests with the FV-6MR (night use) and FV-7 (day use) visors suggested that the current USAF standards for haze may not adequately predict either the user acceptance or mission compatibility. In addition to the ALEP visors, the standard USAF sun and clear visors were also tested for comparison purposes. A contrast acuity test served as the measure of visual performance. The results suggest that the effects of haze in the ALEP visors on vision were primarily on low contrast targets, decreasing visual acuity. Presence of a glare source, simulating the sun near the line of sight, enhanced the effects of haze, further decreasing visual performance suggest that higher luminance transmittance mounted visors performed better. Overall, however, the results suggest that the ALEP visors and the standard USAF sun visor performed similarly, indicating that neither the dye technology used in ALEP visors nor the selective filtering of visual spectrum for laser protection is unique. It is recommended that the haze requirement for all ALEP visors not be relaxed from the current USAF helmet visor standard of 2.0%.
DTIC
Thresholds (Perception); Visual Acuity; Haze; Luminance; Visors; Eye Protection; Safety; Eye (Anatomy); Dyes; Standards

19960035482; 96N30307 Battelle Memorial Inst., Columbus, OH USA
Identification of Emerging Research Trends and Issues in Maritime Human Factors
Jackson, James L., Battelle Memorial Inst., USA; Tijerina, Louis, Battelle Memorial Inst., USA; Jun. 23, 1995; 48p; In English
Contract(s)/Grant(s): DAAL03-91-C-0034
Report No.(s): AD-A304170; NBDL-95R003; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Nava l Biodynamics Laboratory (NBDL) has a rich history as the principal U. S. Navy enterprise for conducting biomedical research on the effects of mechanical forces, both motion and impact, encountered aboard ships or aircraft on naval personnel. This biomedical research has included investigations of biomechanical, physiological, perceptual, and cognitive functions of naval personnel. The University of New Orleans (UNO), located near NBDL and a long-time research partner, has recently established an Advanced Marine Technology Center (AMTC) to perform research, development, testing, and evaluation projects in support of U. S. Navy and commercial maritime interests. Both UNO and NBDL have the objective of collaborating on research projects of mutual interest. to facilitate this collaboration, Battelle has been contracted to identify research capabilities, current research and development (R&D) programs, and anticipated research needs for commercial and defense interests that might be supported by the to-be-developed NBDL/AMTC.
DTIC
Human Factors Engineering; Marine Technology; Research and Development; Personnel Development; Biodynamics; Trends; Military Operations; Bioengineering; Motion Sickness

19960035602; 96N30366 Brown Univ., Inst. for Brain and Neural Systems., Providence, RI USA
Synaptic Plasticity in Visual Cortex. From Synaptic Properties to Membranes and Receptors *Final Report*
Cooper, Leon N., Brown Univ., USA; Oct. 31, 1995; 13p; In English
Contract(s)/Grant(s): DAAL03-91- G-0325
Report No.(s): AD-A304169; ARO-29170.7-LS; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We have realistically modeled the two-eye visual environment. We study how orientation selectivity and ocular dominance form simultaneously. In particular, we study the effect of image misalignment between the two eyes on receptive field formation. We have compared how image misalignment affects receptive fields under two different learning rules PCA in the form proposed by Oja in 1982 and BCM. We have chosen to examine these two because they are well defined and have stable fixed points. We have shown that binocular misalignment has very different effects on these two learning rules. For the BCM learning rule misalignment is sufficient to produce varying degrees of ocular dominance, whereas for the PCA learning rule binocular neurons will emerge independent of the misalignment.
DTIC
Eye (Anatomy); Membranes; Binocular Vision; Stereoscopic Vision; Learning; Images; Visual Perception

19960035867; 96N30563 Texas Research Inst., Inc., Austin, TX USA
Estimating Remaining Life in Biological Chemical Suits and Enclosure Materials Phase 2 *Final Report, 16 Aug. 1993 - 15 Aug. 1995*
Bray, Alan V., Texas Research Inst., Inc., USA; Oct. 11, 1995; 80p; In English
Contract(s)/Grant(s): DAAH04-93-C-0012
Report No.(s): AD-A303839; ARO-30938.1-MS-SB2; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The overall goal of this Phase II portion of this SBIR project was the development of a field NDI kit which uses optimized penetrant systems to detect defects in protective clothing materials - An adjunct goal was to investigate the fea-

sibility of using penetrants to determine the extent of decontamination achieved. A classic penetrant approach to NDE of Teflon and similar protective clothing materials was developed. Penetrant development and testing, then proceed to full-suit testing, conducted under laboratory conditions. The types of penetrant(s) to be used and the method of application were investigated. Kits utilizing these developments were developed which focus on effective field use of the inspection technique. An iterative process was followed which allowed for optimization. Later demonstrations of a pure NDE technology and one combining a decontamination effectiveness function were demonstrated at Dugway Proving grounds, and it became clear that the combination had wider application than either function alone. Demonstrations of the technology to fire departments and Hammet teams were met with the same reaction - the decontamination verification function was viewed in an area needing innovation.
DTIC
Decontamination; Teflon (Trademark); Protective Clothing; Penetrants; Chemical Compounds

19960036888; 96N30580 Defence Science and Technology Organisation, Information Technology Div., Canberra, Australia
Human-Computer Interaction: An Overview
Demczuk, Victor J., Defence Science and Technology Organisation, Australia; Sep. 1995; 40p; In English
Report No.(s): AD-A304079; DSTO-TR-0260; DODA-AR-009-410; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report is a summary of current research and topical areas of interest in the Human Computer Interaction field.It covers the areas of User acceptance of computer technology,human performance,human factors methods,usability, human factor standards,user interface software concepts,visualisation,and advanced interfaces.
DTIC
Human-Computer Interface; Human Factors Engineering; Computer Systems Programs

Subject Term Index

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